

Association of Functional Outcome and Post Stroke Depression Among Ischemic Stroke Patients After Three Months Onset : A Preliminary Study

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ASSOCIATION OF FUNCTIONAL OUTCOME AND POST STROKE DEPRESSION AMONG ISCHEMIC STROKE PATIENTS AFTER THREE MONTHS ONSET: A PRELIMINARY STUDY

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ABSTRACT

The Post Stroke Depression (PSD) prevalence among stroke patients after three months onset was high. Functional Outcome influenced depression on stroke patient. This study aimed to investigate the correlation between these variables. This study was a correlational study. The participants were 44 ischemic stroke patients after three months onset, recruited in an outpatient unit. The tools were GRID-Hamilton Rating Scale for Depression 17 (GRID-HAMD 17) for PSD and Barthel Index (BI) for functional outcome. Data was examined using simple linier regression analyses. The prevalence of PSD was 56.82. The median of HAMD-GRID-17 was 10.38 ± 7.58 , and Barthel Index was 69.56 ± 21.69 . The Barthel Index showed a positive correlation with HAMD-GRID-17 ($\beta = -.41$ $p = .006$). The Functional Outcome influences PSD as many as 16.8 %. Correlation between Functional Outcome and PSD in ischemic stroke patients demonstrated a moderate association. Nursing intervention development that consists of functional outcome repairmen to reduce PSD among ischemic stroke patients should be aimed.

Keywords: Functional Outcome, Post Stroke Depression, After Three Months Onset

ABSTRAK

Prevalensi *Post Stroke Depression* pada pasien stroke setelah tiga bulan tinggi.. *Functional Outcome* mempengaruhi depresi pada pasien stroke iskemik.. Penelitian ini bertujuan untuk mengetahui korelasi kedua variable. Partisipan yang terlibat adalah 44 pasien stroke setelah tiga bulan serangan. Pasien adalah pasien unit rawat jalan. Kuesioner adalah GRID-Hamilton Rating Scale for Depression 17 (GRID-HAMD 17) untuk PSD dan Barthel Index (BI) untuk *functional outcome*. Data dianalisis menggunakan regresi linier sederhana. Presentasi PSD adalah 56.82. HAMD-GRID-17 adalah 10.38 ± 7.58 dan Barthel Index adalah 69.56 ± 21.69 . Barthel Index dan HAMD-GRID-17 menunjukkan hubungan yang positif ($\beta = -.41$ $p = .006$). *Functional Outcome* menentukan PSD sebesar 16.8 %. Hubungan antara *Functional Outcome* dan PSD pada pasien stroke iskemik setelah tiga bulan serangan adalah sedang. Intervensi keperawatan yang berfokus pada status fungsional untuk menurunkan PSD harus dikembangkan.

Kata kunci: *Functional Outcome*, *Post Stroke Depression*, Tiga Bulan Setelah Serangan

BACKGROUND

Depression is a common phenomenon which follows a stroke incident. Among ischemic stroke patients, pattern of Post Stroke Depression (PSD) score was increased within three months after onset and persistent until six month (Gbiri, Akinpelu, & Odole, 2010). The score at three month was highest among period after stroke onset. At three months after onset, patient engaged with real life in dealing with stroke (Gbiri, Akinpelu, & Odole, 2010). The prevalence of PSD three months after onset was vary, 31.6 % were in risk of PSD (McCarthy et al., 2016), 27.3% (Li et al., 2014) and 33.5% had major PSD (Cheng et al., 2014), and 47.4% experienced PSD (Kim et al., 2011). Besides a high range, PSD also causes fatigue after one and a half year after the onset (Lerdal et al., 2011), prolonged PSD and suicidal thought (E. Lang & Borgwardt, 2013), low of quality of life after five years onset (Kielbergerova et al., 2015), and recurrent stroke (Yuan et al., 2012). In-addition stroke patient with PSD has 4.4 times of mortality risk than non-PSD stroke patient (Naess, Lunde, Brogger, & Waje-Andreassen, 2010). Functional Outcome is another common complication of stroke. Functional Outcome after stroke rates of 49 % (Khan et al., 2012) and 60.9% (Ojagbemi & Owolabi, 2013) have been reported. A higher score of functional outcome is associated with the Return Home Program versus institution-based rehabilitation (Stein et al., 2015).

Stroke patient with functional outcome impairment has mortality risk of 1.7 (Naess et al., 2010). It was found that there was a significance difference of functional outcome between PSD and non-PSD in stroke patient (X.-G. Jiang, Lin, & Li, 2014). Although the association of functional outcome and PSD has been well established among stroke patient, the association of functional outcome and PSD among stroke patient after three months onset has not been well described. The determination to opt three months after the initial stroke was because the pattern of PSD score mostly increases at three months after onset (Gbiri, Akinpelu,

& Odole, 2010), this study was aimed to investigate the association of functional outcome and PSD among stroke ischemic survivor after three months onset. The association between PSD and executive function as considered treatment factor at three months after onset.

METHODS

a. Sample

Screening to 120 stroke patients was performed since February to May 2018. Forty four patients who were suffering from ischemic stroke after three months of onset were eligible for this study based on the inclusion and exclusion criteria. The sampling method was convenience sampling during the study period. Samples were recruited at outpatient service in Tugurejo Hospital and Kanjeng Raden Mas Tumenggung Wongsonegoro (KRMT) Hospital, Semarang City, Indonesia. The participants had experienced an acute ischemic stroke onset which was diagnosed according to the AHA 2013. Stroke is classically characterized by a neurological deficit attributed to an acute focal injury of the central nervous system (CNS) by a vascular cause, including cerebral infarction, intra cerebral hemorrhage (ICH), and subarachnoid hemorrhage (SAH), and becomes a major cause of disability and death worldwide (Sacco et al., 2013). The criteria of inclusion including, 18– 80 years old, admitted to the hospital within three months after stroke onset, had no aphasia and MMSE score >12. The exclusion criteria was patient with hearing impairment. The drop out was hemorrhage transformation. Ethic was legally from and. Ethical approval was obtained from the Ethics and Research Committee of Medicine Faculty, Diponegoro University in affiliation with Kariadi Hospital. Considering the hospital research procedure, Ethical approval was re-checked at Tugurejo Hospital. The participants received an explanation regarding research procedure and were then given an informed consent.

b. Assessment

Assessment of PSD used GRID-HAMD 17. The questionnaire consists of 17 questions (Williams et al., 2008). The GRID-HAMD 17 has passed language validity. Backward translation was conducted into Bahasa and continued with face validity. Reliability test of GRID-HAMD 17 among stroke patient was also conducted with *Alpha Cronbach*, $r = .766$. Assessment of executive function was conducted using Barthel-Index (Mahoney & Barthel, 1965)(Oveisgharan et al., 2006). The tool was tested with inter-rater observation between two observers. The Kappa result was .001.

c. Statistics Analysis

Participants' clinical and socio-demographic characters such as age, sex, income, and education were presented using descriptive statistics frequencies. Characteristics of age and GRID-HAMD 17 data continuum were analyzed for homogeneity using Saphiro-Wilk. Homogeneity of variance was determined using median or mean. Age and GRID-HAMD 17 presented in mean/median and standard deviation. Post Stroke Depression and Executive Functional category also described in percentages. Post Stroke Depression and Executive Functional continuum data were analyzed in simple linear regression. Level of significance was set at $p < .05$.

RESULTS

Table 1 Characteristics of Participants

Characteristics	n (participants)	%	Median (Range)	IQR
Sex				
- Male	20	45.5		
- Female	24	54.5		
Employed				
- Employed	18	40.9		
- Unemployed	26	41.9		
Education				
- Low Education	40	90.9		
- Higher Education	4	9.1		
Income				
- Low	23	52.3		
- Moderate	20	45.5		
- High	1	2.3		
Age			57.9 (38-78) years	±8.87

The continuum data of GRID-HAMD 17 and BI were not normally distributed. The median of GRID-HAMD 17 was 10.38 ± 7.58 (0-26), and BI 69.56 ± 21.69 (20-85) respectively. The percentages of PSD of ischemic stroke patients after 3 month onset were 43.2%

no depression, 40.9% mild, 4.5% moderate, and 11.4% severe. The percentages of Functional Outcome were 70.5% mild dependent, 13.6% moderate dependent, 11.4% dependent, and 4.5% total dependent.

Table 2 Univariate of Post Stroke Depression and Functional Outcome

	n	%	Median (Range)	IQR
GRID-HAMD 17			10.38 (0-26)	±7.58
≤ 7 no depression	19	43.2		
≤ 18 Mild	18	40.9		
≤ 24 Moderate	2	4.5		
>24 Severe	5	11.4		
Barthel Index			69.56 (20-85)	±21.69
Total Dependent	2	4.5		

	n	%	Median (Range)	IQR
Dependent	5	11.4		
Moderate	6	13.6		
Mild	31	70.5		
Independent	0	0		

Table 3 Simple linier Regression

Factor	c	Unstandardized Coefficient B	Standardized Coefficient (β)	p
Functional Outcome	20.25	-.142	-.41	<.001
R2= .168, adjusted R2= .148,				

The correlation between Functional outcome and PSD among ischemic stroke patients after three month onset showed moderate and negative pattern at -.41. A higher Functional Outcome decreases PSD. Coefficient determination was .168. The coefficient demonstrated that linier regression determined 16.8% variation of functional outcome well explain to the PSD variable. Statistical analysis showed a significance correlation between Functional Outcome and PSD among ischemic stroke patients after three months onset $p < .001$.

DISCUSSION

This study examined the association between functional outcome and PSD among ischemic stroke patient after three months onset. Our study showed that the percentage of PSD among ischemic stroke patients after three month onset was higher than that in other studies (McCarthy et al., 2016)(Li et al., 2014)(Cheng et al., 2014)(Kim et al., 2011). In this study, the percentage of functional outcome impairment was 100% ranged from mild to totally dependent, meanwhile other studies found the impairment were 49 % (Khan et al., 2012) and 60.9% (Ojagbemi & Owolabi, 2013). The results of our study showed negative moderate association between functional outcome and PSD. Other studies supported that PSD at discharge and after three months onset was associated with functional outcome, although PSD does not influence the motor recovery (Nannetti, Paci, Pasquini, Lombardi, & Taiti, 2005). Depression at three month after onset correlated with poor functional outcome at 15 months after onset (Kaste, Erkinjuntti,

Pohjasvaara, Vataja, & Leppa, 2001). Major depression was strongly associated with functional dependency (Ojagbemi & Owolabi, 2013).

In comparison of statistics analysis, many studies showed that functional outcome using BI score was significantly difference between PSD and non PSD group in stroke patient after three months onset (Nannetti et al., 2005)(X.-G. Jiang et al., 2014). Specifically in ischemic stroke patient after three months onset, the BI score was also different (Tang et al., 2013). However, few studies found there was no significance difference of BI between PSD and non-PSD in ischemic stroke after three months onset (Zhang et al., 2010). In multivariate statistics analysis, it was stated that handicap (mRS score) predicted the occurrence of PSD among ischemic stroke patient at three months onset (Zhang et al., 2010).

For unspecified time after stroke, comparison analysis supported that post stroke disability using mRS score was significantly different among stroke patient (Oni, Olagunju, Olisah, Aina, & Ojini, 2018). Functional score was included into multivariate model in predicting the PSD among ischemic stroke patient with other variables (Tang et al., 2013).

Correlation of PSD and functional outcome can be explained by lesion area. The cortex area lesion which determined PSD and Functional Outcome Post Stroke Depression showed higher rates of infarcts in cortical-subcortical area of the frontal and temporal lobe as well as in internal capsule (including genu, anterior and posterior limb) (Zhang et al., 2012)(X. Jiang, Lin, & Li, 2014).

Other studies, however, found a different result. One study asserted that Functional Outcome and depression is not correlated (Lohner, Brookes, Hollocks, Morris, & Markus, 2017). Physical disability and psychiatric rating scale, which measure the emotional dimension of disability caused by the disease expresses as depression, showed no correlation as well. The PSD is not a simple reaction to physical disability (Bendsen, Bendsen, Lauritzen, & Vilmar, 1997). Other influencing factors toward PSD and its pattern need to be investigated among ischemic stroke patient after three months onset.

It is widely agreed that The Functional Outcome and PSD should be treated. One of studies suggested that physical exercise improves physical functional recovery after stroke (Pyöriä et al., 2007). The incident of Post Stroke Depression can also be diminished after patients receiving a treatment. The treatment was psychosocial intervention. The indicator of PSD was 5-HTTLPR and STin2 VNTR polymorphisms of the SERT genotyped in DNA (Kohen et al., 2011).

CONCLUSION

The Functional Outcome was moderately correlated with Post Stroke Depression on ischemic stroke patient after three months onset. Nursing intervention development which consisted of functional outcome enhancement in order to reduce PSD among ischemic stroke patients after three months onset should be aimed. The obvious limitation is this study explained only one variable which influences PSD in stroke ischemic patient after three months onset, therefore other variables need to be examined in addressing the PSD phenomena.

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